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**United States Patent** [19]

Hirose et al.

[11] **Patent Number:** 5,888,126[45] **Date of Patent:** Mar. 30, 1999[54] **POLISHING APPARATUS INCLUDING  
TURNTABLE WITH POLISHING SURFACE  
OF DIFFERENT HEIGHTS**[75] **Inventors:** Masayoshi Hirose, Yokohama; Yoshimi Sasaki, Atsugi; Akira Ogata; Seiji Ishikawa, both of Yokohama; Tamami Takahashi, Yamato; Hirokuni Hiyama, Tokyo; Yutaka Wada, Yokohama, all of Japan[73] **Assignee:** Ebara Corporation, Tokyo, Japan[21] **Appl. No.:** 590,836[22] **Filed:** Jan. 24, 1996[30] **Foreign Application Priority Data**Jan. 25, 1995 [JP] Japan ..... 7-028722  
Jul. 20, 1995 [JP] Japan ..... 7-206594[51] **Int. Cl.<sup>6</sup>** ..... **B24B 29/02**[52] **U.S. Cl.** ..... **451/287; 451/288; 451/495;  
451/527**[58] **Field of Search** ..... 451/41, 293, 285,  
451/287, 288, 289, 290, 495, 520, 527,  
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3-259520 11/1991 Japan .*Primary Examiner*—Timothy V. Eleg  
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L.L.P.[57] **ABSTRACT**

A polishing apparatus includes a turntable with an abrasive cloth mounted on an upper surface thereof, and a top ring disposed above the turntable for supporting a workpiece to be polished and pressing the workpiece against the abrasive cloth under a predetermined pressure. The turntable and the top ring are movable relatively to each other to polish a surface of the workpiece supported by the top ring with the abrasive cloth. The abrasive cloth has a projecting region on a surface thereof for more intensive contact with the workpiece than other surface regions of the abrasive cloth. The projecting region has a smaller dimension in a radial direction of the turntable than a diameter of the workpiece when the projecting region is held in contact with the workpiece. A position of the projecting region is determined on the basis of an area in which the projecting region acts on the workpiece.

**21 Claims, 21 Drawing Sheets**